Space Weather Forecast

Issued on Wednesday, 03 November 2021 at 12:09 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further M-class flares. G1/Minor G2/Moderate geomagnetic storms likely, and slight chance of G3/Strong geomagnetic storms late day 1 into day 2.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: There are three sunspot regions on the visible disc with observed solar activity returning to Low over the last 24 hours. The peak flare was a low level Common class flare at 02/1305UTC, from the sunspot region which is now located near the southwest limb. The sunspot region transiting the northwest quadrant (which gave the Moderate flare and Earth directed CME early on 2nd), reduced slightly in overall size, and decay in it's lead/trailer spots. However, the compact central portion persists. The other sunspot region in the northeast quadrant appears stable with very little recent activity.

A further CME was observed directed towards the southwest launched from near the southwest sunspot region after midday UTC on 2nd. This was modelled and misses Earth. Two further CMEs were observed, one late on 2nd from beyond the west limb, and another during early hours UTC of 3rd from beyond the east limb. Neither of these CMEs is expected to be Earth directed.

Solar Wind / Geomagnetic Activity: Solar wind parameters indicate a waning connection to the high speed stream from coronal hole 16. Solar wind speeds decreased through the period, and are currently around 520km/s. Total interplanetary magnetic field was at weak levels, with the important north-south component fluctuating weakly. Geomagnetic activity was Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained slightly elevated but below minor storm levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to remain mainly low through the next four days, but with a continuing chance of Moderate class flares from the spot currently transiting to the northwest quadrant.

Solar Wind / Geomagnetic Activity: The high speed stream from coronal hole 16 is expected to continue to influence earth on day 1 (3rd). A continued slight chance of glancing blows from small coronal mass ejections on days 1 and 2 (3rd and 4th) remains possible, but the main feature is the anticipated arrival of the halo coronal mass ejection, associated with the Moderate flare on 2nd, is expected to be either late on day 1 or early day 2, with a current estimated arrival of 0001 UTC on the 4th. Quiet to Active geomagnetic conditions are forecast to predominate through the next four days, though the arrival of this halo CME brings a likelihood of G1/Minor G2/Moderate storm intervals at or after its arrival with a slight chance of G3/Strong storm

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intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to be below storm level with a general decrease towards background levels.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	70	70	30	10
Strong	G3	No	20	20	1	1
Severe	G4	No	5	5	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	3	3	3	3

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	5	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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